

**THE EFFECT OF MACROECONOMIC VARIABLES ON THE  
VALUE OF REAL ESTATES SUPPLIED IN KENYA**

**BY**

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## **DECLARATION**

This Research Project is my original work and has not been submitted for award of a degree at the University of Nairobi or any other University

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## **DEDICATION**

I dedicate this project to my mother Joyce Mugure Njoroge.

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## **LIST OF ABBREVIATIONS**

|      |   |
|------|---|
| AEB  | African Economic Brief                  |
| AFDB | African Development Bank                |
| CAHF | Centre for Affordable Housing in Africa |
| CBK  | Central Bank of Kenya                   |
| CPI  | Consumer Price Index                    |
| DCF  | Discounted Cash Flow                    |
| GDP  | Gross Domestic Product                  |
| GGM  | Gordon Growth Model                     |
| KNBS | Kenya National Bureau of Statistics     |
| KPDA | Kenya Property Development Association  |
| NPV  | Net Present Value                       |
| PPI  | Producer Price Index                    |
| QS   | Quantity Surveyors                      |
| UN   | United Nations                          |

## **ABSTRACT**

The real estate market plays a very important role in any economy. It is known to have a dramatic multiplier effect and is a key economic indicator. The real estate market has experienced significant growth in the last decade with many countries experiencing house price fluctuations. The Kenyan real estate market has been experiencing a boom in the past ten years and the latest findings have shown that the trend will continue into the foreseeable future. To ensure the economy is properly positioned a study into the forces that contribute to value of real estate supplied is paramount. This study investigates the effects on macroeconomic variables on effect value of real estate supply in Kenya. Monthly secondary data for a period of five years spanning from 2009 to 2013 was collected from publications in government and real estate industry. Descriptive as well as multiple regressions were run using SPSS version 21.0. A multivariate regression model showing the relationship between residential real estate prices and various variables was tested. The variables are Inflation rate, GDP rate, Employment growth rate, Population Growth rate, Cost of Construction and Percentage of debt financing. The results show that there were positive relationships with GDP and value of real estates supplied, being the most significant, followed by Inflation, Cost of construction and Percentage of debt financing. Data on Population growth rate and Employment rates were constant and their relationship could therefore not be established. Value of real estate supply has shown an upward trend with time hence the real estate market in Kenya is expected to continue to grow. Even without significant changes in the variables, the effect of time is that value of real estate supply continued to grow. This also indicates that the real estate market is significantly stable and will continue to impact greatly of the economic growth of the country.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

According to UN-Habitat (2011), the real estate development in most emerging economies in Africa is faced by a dilemma resulting from the inability to adequately finance urban shelter, amidst a dire need and ever-increasing demand for housing. As such, there has been a rise in poverty in the cities mainly in developing countries in a process referred to as urbanization of poverty. This has led to influx of cities in search for better lifestyles causing growth of slum areas.

The cost of housing has accelerated in the past few years; a situation that has had considerable implications for the desire of home ownership, and has consequently undermined development of the housing sector. The supply of housing is the main objective of real estate developers and their main achievement would be to meet the demand in their respective markets. One of the measures of supply is the monetary value employed to develop the real estate.

Demographics are the data that describes the composition of a population, such as age, race, gender, income, migration patterns and population growth. These statistics are an often overlooked but significant factor that affects how real estate is priced and what types of properties are in demand. Major shifts in the demographic Figures of a nation can have a large impact on real estate trends for several decades (Nguyen, 2013).

### **1.1.1 Value of Real Estate Supplied**

The term real estate is used to refer to things that are not movable such as land and improvements permanently attached to the land, and ownership rights associated with the real estate are referred to as real property (Brueggeman & Fisher, 2008). The real estate development process includes the following three basic stages: building permit, start of construction and completion. Usually, the building cost is expressed as the cost per square metre of the building.

The value of construction is the multiple of number of square footage and cost per square foot. The term new construction refers to completions, or otherwise, the total square footage in all new buildings that have been given a certificate of occupancy or passed the final inspection under the building permit during the period. The term real estate supply refers in general to a schedule that describes the quantity of commercial space or housing units newly constructed at various prices.

Labour and materials costs have not only been prominently cited as components in the construction cost structure but they have also been tagged as the largest proportions in the total construction costs. In Denmark the typical building costs for social housing schemes can be divided as follows; materials 50 percent, labour 30 percent, heavy equipment 5 percent, construction management and supervision absorbs the other 15 percent. Construction materials account for over half of the final cost of house building while the cost of labour account for less than third, and overheads and profit stand for the rest (Warsame, 2006).

### **1.1.2 Macroeconomic Variables**

Inflation is often defined as a sustained increase in prices for a broad range of prices. It is theoretically expected that the higher the inflation rate the higher the house prices due to a higher cost of construction (Coward and Tihinen, 2013). The major sufferer for the inflation is fixed income people as inflation will reduce their purchasing power and if inflation remain on high zone there will be reduction in consumer spending and in long run it will affect the economic output and in turn growth rate (Goyal,2012).

As the middle class grows, so do cities which today host one out of four Africans. UN-Habitat estimates that African cities become home to over 40,000 people every day. Most of the world's largest cities with population growth rates above 5% are in Africa. Such trends foresee immense strains on affordable urban housing, and exert a strong push on demand for it, which translate to an equivalent need in supply. (Centre for Affordable Housing, 2012).

Another key factor that affects the value of real estate is the overall health of the economy. This is generally measured by economic indicators such as the GDP, employment data, manufacturing activity, the prices of goods, etc. The GDP is the market value of all officially recognized final goods and services produced within a country in a given period of time. GDP per capita is often considered an indicator of a country's standard of living. Under economic theory, GDP per capita exactly equals the Gross Domestic Income per capita. When the GDP is low it means that the people's purchasing power is also low hence the demand for real estate and consequently the house prices will decrease. Conversely, when the GDP increases, the purchasing power also increases hence increasing the demand of Real estate and

house prices go up. Broadly speaking, when the economy is sluggish, so is real estate. (Case et al, 2005).

Related to economic growth is unemployment. Clearly when unemployment is rising, less people will be able to afford a house. In fact, demand for housing is often noted to be income elastic (luxury good); rising incomes leading to a bigger % of income being spent on houses. Similarly in a recession, falling incomes will mean people can't afford to buy and those who lose their job may fall behind in their mortgage payments and end up with their home repossess (Pettinger, 2013).

Demographics are the data that describes the composition of a population, such as age, race, gender, income, migration patterns and population growth. These statistics are an often overlooked but significant factor that affects how real estate is priced and what types of properties are in demand. Major shifts in the demographic Figures of a nation can have a large impact on real estate trends for several decades (Nguyen, 2013).

### **1.1.3 Value of Real Estate Supplied Versus Macroeconomic Variables**

Inflation is one of the macroeconomic and political factors that impose heavy costs and delays in building projects. Generally, overhead costs are calculated as a percentage of direct costs and thus are affected directly by the inflation of unit prices of labour and materials in addition to other cost increases caused by government regulations. These factors are often uncontrollable but predictable occurrences and are not confined to specific projects in any region (Warsame, 2006).

The overall health of the economy is another key factor that affects the value of real estate. This is generally measured by economic indicators such as the GDP, employment data, manufacturing activity, the prices of goods, etc. Broadly speaking, when the economy is sluggish, so is real estate. Demand for housing is dependent upon income.

With higher economic growth GDP and rising incomes (employment rate) people will be able to spend more on houses; this will increase demand, push prices up and require developers to supply . In fact, demand for housing is often noted to be income elastic (luxury good); rising incomes leading to a bigger % of income being spent on houses. Similarly in a recession, falling incomes will mean people can't afford to buy and those who lose their job may fall behind in their mortgage payments and end up with their home repossess. Related to economic growth is unemployment. Clearly when unemployment is rising, less people will be able to afford a house (Pettinger, 2013).

Mulei (1990) addressed the issue of isolating the provision of shelter with other aspects of urban life. He notes that both production and consumption of houses are closely linked to income groups. His concern is that the overall investment in housing in the country is discouraging since only 3 per cent of the GDP is invested in housing less than half of which is in modern dwellings. In order to solve the problem he suggests that housing has to be examined within the development process as a whole.

Population growth is also a major determinant of real estate supply. Population is the total number of persons inhabiting a country, city, or any district or area. Total demand for property is determined by population size and changes in the structure of

the population caused by migration and long-term changes in the birth and death rates. The population of persons reside in houses. An increase in population would lead to a demand for house and therefore trigger supply to meet this demand (Makena, 2013).

The reasons for the relationship between house prices and unemployment could include that both changes in unemployment and house prices are caused by the deviations of the economy from its long term potential output, thus the relationship between them is from an 'indirect' effect, and simply an indication of economic conditions. A more 'direct' affect for the relationship would be higher unemployment causing more bank repossessions which would increase the market supply of housing, consequently reducing the average price of housing. The actual relationship between house prices and unemployment is likely to be a mixture between the direct and indirect relationships, as housing is an asset with a complicated relationship with the macro economy. For instance if house prices fell caused by unemployment, then building new domestic housing becomes less profitable, reducing supplier activity, which would then feedback via the construction industry creating more unemployment (Centre for Affordable Housing, 2012).

As the middle class grows, so do cities which today host one out of four Africans. UN-Habitat estimates that African cities become home to over 40,000 people every day. Most of the world's largest cities with population growth rates above 5% are in Africa. Such trends foresee immense strains on affordable urban housing, and exert a strong push on demand for it, which translate to an equivalent need in supply. (Centre for Affordable Housing, 2012).



#### **1.1.4 Real Estate Supplied and Macroeconomic Variables in Kenya**

The Kenyan market, as with many other countries in Africa, is characterized by a large demand and a chronic undersupply of formal housing. This situation has a great impact on prices. There are only a handful of private developers in Kenya that can afford to invest into medium to large scale developments of 200 units and above for middle to low income segments.

Property development in Nairobi County, the capital city of Kenya is lagging behind, construction of new houses is growing at 7.5 percent of government targets with only 15,000 new units in 2013 against a target of 200,000 housing builds a year in the city. This growth rate is not enough housing in future as the city's population is set to increase and the city is heading for extreme shortages in urban middle class housing and failed development goals, based on current trends. The housing shortage in Nairobi is acute, and deteriorating (KPDA and Hass Consult Limited, 2013).

According to KNBS, in Kenya the real estate sector has been a driver of growth in the past five years. Inflation has pushed up the cost of doing business contributing to the cutting down of the number of properties. Investors in real estate who are looking for safe haven for their money in turbulent times in the equity markets have underestimated risk. Property price fluctuations have been witnessed in many countries over the past decades which have been associated with financial instability. The rate of inflation has been volatile, moving from annual average of 10.5%, 4.1%, 14.0%, 9.4%, and 5.7%, from the year 2009 to 2013 (Kenya Economic Survey, 2014).

As of 2013, Kenyan population growth is estimated at 4.2% per annum. Based on this growth and the rate of urban migration, the yearly annual increase in demand for housing in Kenya is of 206 000 units annually of which 82 000 in urban areas. In 2011, the ministry of housing estimated that the formal supply of houses to the market reached 50 000 creating a 156 000 shortfall which added up to the 2 million units existing backlog. In 2012, it is estimated that further 85 000 units were also added to the backlog (Centre for Affordable Housing, 2012).

According to recent research by the African Development Bank, the continent's middle class has reached 34.3% of the population in 2010, up from 26.2% in 1980 (AfDB, 2011). In Kenya, it encompasses 44.9% of the population. This phenomenon has been accompanied by rapid urbanization and strong growth in consumption expenditure and demand for certain types of goods and services. Housing demand has not, and will not, remain idle to these changes (African Economic Brief, 2013). The spread between the CBK base rate and bank lending rates widened last year, as banks increased their profits from lending. As a result, intense development is now planned for just a few suburbs (The HASS property index, 2013).

Access to finance is one of the key obstacles for the growth of real estate developers. Most housing is financed primarily through debt. Considering the time needed for construction, potential delays as well as high and fluctuating interest rates, the cost of debt can weight negatively on the total financing structure of developments. In addition, access to equity is in short supply making financing thornier as it becomes difficult for developers to become eligible for loans. Excessive debt leveraging of real estate developments also obliges developers to engage into high levels of pre-sales in

order to have a cash-flow that allows for loan repayments over the course of construction. This can compromise any deposit finance from initial purchasers who invest in pre-sales and induces a cash-flow risks to the developers as well as foregone income since they would tend to sell at a lower price than if they did at the end of construction (African Economic Brief, 2013).

## **1.2 Research Problem**

The housing sector is one of the backbone sectors in the construction industry and determines the success and failure of this industry and also plays a major role in the economy of many developed countries. In Kenya real estate market in both rural and urban is characterized by a huge mismatch between demand and supply of assets (Centre for Affordable Housing, 2012). Macroeconomic factors have a major effect of pricing of houses and hence supply. Overhead construction costs are calculated as a percentage of direct costs and thus are affected directly by the inflation of unit prices of labour and materials in addition to other cost increases caused by government regulations (Warsame, 2006).

A study on the economic variables that influence the residential property market in South Africa, with a perspective on the developer, between the year 2006 and 2012 was undertaken by Theuns (2012). The research findings were that the GDP contributed to 69% in the changes that occurred in the house price index and a further 25% contributed by factors together such as: Inflation Rate, household disposable income, final household consumption, household and debt ratio (Topel and Rosen, 1988) studied new housing supply by considering whether current asset prices are sufficient for housing investment decisions. If they are, then the short-run and long

run investment supplies are identical; if they are not, because of costs associated with moving resources between industries, then short run supply is less elastic than long run supply.

Few studies have delved into effects of macroeconomic factors on Value of real estate supply. Karoki (2013) studied the Determinants of Residential Real Estate Prices in Kenya and The results show that that there are significant negative relationship between residential real estate prices and interest rates, and positive relationships with GDP, and level of money supply. Interest rates have the most significant effect on house prices followed by GDP and level of money supply. Thus the rise in property prices is well explained by macroeconomic variables. Kangongo (2011) did a study to investigate the relationship between property price and inflation rates. She observed that property prices have been continuously increasing gradually while inflation rates have been fluctuating. Government should set policies to encourage people to invest in real asset like property so has to hedge inflation when it is high.

From previous research done locally, it is evident that the outcomes differ. Kangongo (2011) established that real estate acts as an inflation hedge. (Karoki, 2013) found a positive and significant relationship between supply of houses in real estate sector in Kenya and the price levels and growth in GDP. It was concluded that growth of GDP, price levels and interest levels have an influence on supply of houses. (Hans, 2007), (Shiller, 2005) and (Tihinen, 2013) indicate that inflation affects cost of real estate development which is directly passed on to the developer leading to a negative effect on value of development. Results from the various studies are vary on the effects of different macroeconomic factors on value of real estate supply. What then is the effect

of macroeconomic factors on the value real estate supplied in Kenya?

### **1.3 Research Objective**

The research objective is to determine the effect of macroeconomic variables on the value of real estate supplied in Kenya.

### **1.4 Value of the Study**

It is expected that this study will add to the body of knowledge in existence in the real estate field which will be beneficial to academicians. It will also provide a basis for further research in the field. The study will also benefit the consumers since houses will become more affordable once the developers benefit from the study. Financiers of housing projects will also benefit in the knowledge achieved in the study as they are major stakeholders in the building industry.

The policy makers in the government who would be interested in knowing the determinants of supply of houses in real estate development and what ought to be done to increase the quantity of housing in the market despite the rapid growth in this sector. This would enable them to formulate appropriate policies that would see adequate quantities of housing being supplied in the market at affordable prices to meet the market requirement. The government will also aim to introduce low cost materials in the construction industry to bring down the costs. If the results are negative, the government will acquire strategies to assist developers achieve the housing supply target through various policies.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The term real estate supply refers in general to a schedule that describes the quantity of commercial space or housing units supplied at various prices. Housing supply is the result of the decision making by land developers and by the actual owners of housing. Recent years have witnessed increasing rates of inflation accompanied by high and volatile interest rates. Although these factors have affected the entire economy, their most drastic effect has been on housing as shown by wide swings in construction activity and in the turnover of the existing stock of housing as well as by a growing feeling that adequate housing is out of the reach of an increasingly large number of households.

The chapter looks into various theories that have been studied by earlier researchers and scholars, highlighting their approaches and findings in the above areas. The first section of this chapter covers a theoretical review and work of earlier researchers while the second part of this chapter will show the empirical evidence showing results of earlier researches. The final bit will be to bring out the research gap in this area of study, and hence show the need for the study.

#### **2.2 Theoretical Review**

In this section, The Rational Expectation Theory, The Gordon Growth Model Theory and Monetarism Theory of Inflation have been discussed in relation to the real estate market and inflation.

### **2.2.1 Rational Expectation Theory**

The theory was developed by Muth (1961). It states that current expectations in the economy are the equivalent to what the future state of the economy will be. In expectation theory, people in the economy make choices based on their rational outlook, available information and past experiences. The way in which developers form their expectations of development values, cost and hence profitability influences their decisions to develop (Henneberry & Rowley, 2000). Investors believe that the price of the property will be higher in the future; it will hold the property until the price rises.

According to Muth (1961), the average expectation is more accurate than adaptive models such as the cobweb model. According to rational expectancy theory, the optimal forecast about the future is made using all available information. As a result, rational expectancy theory changes real estate asset price over time; it should be unpredictable and thus follow a random walk (Malpezzi & Wachter 2005). Adapting an option pricing approach, developers' expectations using assumptions of rationality, he argues that although the risk of overbuilding is higher when construction time is longer, developers will continue to develop in the knowledge of this risk because the benefits of good outcomes are believed to outweigh the costs of poor outcomes.

### **2.2.2 The Gordon Growth Model Theory**

The Gordon growth model theory suggests that real estate can be considered a perfect hedge against inflation. Real estate is a long-lived asset with income that can adjust to

inflation. Real estate asset pricing is given by the Net Present Value (NPV) of the future rent cash flow stream, which is assumed to grow indefinitely at a constant rate (g) and is discounted by the appropriate nominal rate. (r). therefore real estate price =  $NPV(\text{future Rent Income}) = \text{Next Period Rent} (r-g)$ . Inflation will affect the discounted rate r and the rent growth rate g in an equal measure.

The expected earnings growth model, based on DCF model and the GGM are used in pricing real estate assets. GGM model explains that the earnings are expected to grow at a constant rate during the holding period. The model further assumes that the asset has income with current value and the income is expected to grow at a constant rate. Another assumption is that the discount rate of money remains constant and is equal to the cost of capital for the asset. Gordon (1959) noted that for the investors the cost of capital for the assets equals to the returns they expects from the assets.

### **2.2.3 The Q Theory of Housing Investment**

Q theory posits that investment in any asset is a function of the Q ratio: the ratio of the market valuation of the asset to its replacement cost (or marginal cost). In the case of housing, arbitrage by consumers between new- and existing-housing markets is what drives housing investment. If, for example, existing homes are expensive relative to new homes, then housing consumers will demand more new homes. Alternatively, if existing homes are cheap relative to new homes then consumers will buy more existing homes and fewer new homes. In a competitive environment, where builders and developers (housing suppliers) are price takers, suppliers respond to the demands of housing consumers, building new homes when existing home prices are high relative to new homes. The Q ratio, or the price of existing housing relative to the



price of new homes, is related to efficiency of housing markets.

Meese and Wallace (1994) found evidence that in the long-run housing market prices (compared on the basis of calculated present values) are consistent with market efficiency. However, in the short run, they find evidence that this efficiency relationship does not hold, most likely as a result of high transactions costs rather than because of bubbles or irrational behavior. Dipasquale and Wheaton (1994) found that the price adjustment process is gradual for single-family housing; housing demand is found to be more sensitive to housing price levels and less sensitive to annual user costs.

Rosenthal (1999) argues that present value studies of housing market efficiency are prone to controversy because housing prices are compared to unobserved discount streams of future rents. He examines two equilibrium conditions that depend only on current and past values, and finds that residential housing is priced in an efficient manner. New building prices shocks do not have a discernible effect on construction costs and dissipate in two quarters. Different vintage buildings appear to converge back to equilibrium at the same rate, suggesting they are close substitutes and provide equal expected returns. Thus, we believe that past studies, when considered in total, support the use of a Q ratio as a measure of equilibrium.

Topel and Rosen (1988) point out that Q theory assumes that investment decisions are myopically determined because builders are assumed to compare current asset prices with current marginal costs of production (replacement cost). (Kydland and Prescott, 1982) show that the idea that current prices embody all the information necessary for

investment decisions assumes that short- and long-run supply coincide. However, if short-run supply is less elastic than long-run supply (because it takes time to transfer factors of production), then current prices will no longer be sufficient for investment decisions. In this case, builders must form expectations of future prices in making current production decisions. Summers (1981) demonstrates that the current Q ratio as well as past values of Q affect investment when short- and long-run supply are not identical.

The Q model of housing investment is described as  $I_t = I(Q_t, Q_{t-1}, Q_{t-2}, \dots, Q_{t-n})$ . Where,  $I_t$  = housing investment in period t.  $Q_t$  = the Q ratio in period t defined as the ratio of existing- to new-home prices.

#### **2.2.4 Monetarism Theory of Inflation**

Friedman and Schwartz (1963) holds that only money matters and this led to the development of the monetary theory and as such monetary policy which is a more potent instrument than financial policy in an economic stabilization. According to monetarism the money supply is the dominant though not exclusive determinant of both the level of output and prices in the short-run, and of the level of price in the long-run. The long-run level of output is not influenced by the money supply.

Inflation is always and everywhere and it's a monetary phenomenon that arises from a more rapid expansion in the quantity of money than in total output. The money that exists will determine the amount of money people spend. In any market the price of the property is determined by the supply and demand, therefore the prices of items will go up only when the supply is lower than the demand and vice versa. According to

Chin (2002), real estate markets are continuously adjusted to equilibrium where price range is adjusted according to supply. Therefore the rise of property prices in Kenya is attributed to the high demand and low supply.

### **2.3 Factors That Affect the Value of Real Estate Supply**

From a developer's perspective, the lack of equity finance in the residential housing sector has been a critical constraint contributing to the insufficient, or oftentimes inadequate, housing stock in several countries across the continent. Housing developments with too low equity make it difficult to access debt finance for construction, resulting in no margins for delays or in cost over-runs. This limits the development of housing projects delivered to market, resulting in higher priced housing stock and threatening the capital introduced by the developer in the first place. Excessive debt leveraging of real estate developments also obliges developers to engage into high levels of pre-sales in order to have a cash-flow that allows for loan repayments over the course of construction. This can compromise any deposit finance from initial purchasers who invest in pre-sales and induces a cash-flow risks to the developers as well as foregone income since they would tend to sell at a lower price than if they did at the end of construction (African Economic Brief, 2013).

Another key factor that affects the value of real estate is the overall health of the economy. This is generally measured by economic indicators such as the GDP, employment data, manufacturing activity, the prices of goods, etc. Broadly speaking, when the economy is sluggish, so is real estate. Demand for housing is dependent upon income. With higher economic growth GDP and rising incomes (employment rate) people will be able to spend more on houses; this will increase demand, push

prices up and require developers to supply . In fact, demand for housing is often noted to be income elastic (luxury good); rising incomes leading to a bigger % of income being spent on houses. Similarly in a recession, falling incomes will mean people can't afford to buy and those who lose their job may fall behind in their mortgage payments and end up with their home repossessed. Related to economic growth is unemployment. Clearly when unemployment is rising, less people will be able to afford a house (Pettinger, 2013).

Demographics are the data that describes the composition of a population, such as age, race, gender, income, migration patterns and population growth. These statistics are an often overlooked but significant factor that affects how real estate is priced and what types of properties are in demand. Major shifts in the demographics of a nation can have a large impact on real estate trends for several decades. For example, the baby boomers born between 1945 and 1964 are an example of a demographic trend with the potential to significantly influence the real estate market (Nguyen, 2013).

Population growth is also a major determinant of real estate supply. Population is the total number of persons inhabiting a country, city, or any district or area. Total demand for property is determined by population size and changes in the structure of the population caused by migration and long-term changes in the birth and death rates. The population of persons reside in houses. An increase in population would lead to a demand for house and therefore trigger supply to meet this demand (Makena, 2013).

The estimated population of Kenya in 2010, was 40.9 million inhabitants making it

the 8th most populous country on the African continent. The population has grown rapidly from just 6 million in 1950, and is forecast to reach 85 million by 2050. This represents a compound annual growth rate of 2.7 percent. Kenya is a large country in terms of land area and has a population density of just 69 inhabitants per square kilometre. The rapid population growth also implies a rising need for housing. New housing is needed to cover both natural household formation arising from higher birth rates than death rates, but also internal migration. As population moves away from rural areas into urban areas extra urban housing is required to accommodate the internal migrants (World Bank. 2011).

Interest rates are a major factor since most housing is financed primarily through debt. Considering the time needed for construction, potential delays as well as high and fluctuating interest rates, the cost of debt can weight negatively on the total financing structure of developments. Therefore the source of funding for real estate developers is a major determinant of the cost of construction and consequently the supply of real estate (African Economic Brief, 2013).

Cost is among the major considerations throughout the project management lifecycle and can be regarded as one of the most important parameters of a project and the driving force of project success. Despite its proven importance it is not uncommon to see a construction project failing to achieve its objectives within the specified cost. Cost overrun is a very frequent phenomenon and is almost associated with nearly all projects in the construction industry. Low quality materials cause higher construction cost than expected because of the loss of materials during construction. This results from a lack of standards for materials and management systems. A major factor

contributing to the time-delay and cost-increase was the inadequacy of money and time allocated to the design phase. The three main causes of time-delays were, in order, the number of change orders, financial constraints and owners' lack of experience in construction.

The three main causes of cost overruns on the other hand were, in order, contractor-Elide and material-related problems and, again, owners' financial constraints. Design changes, inadequate planning, unpredictable weather conditions; and fluctuations in the cost of building materials are common factors causing cost overruns. Usually, the building cost is expressed as the cost per square metre of the building. The value of construction is the multiple of number of square footage and cost per square foot (Memon, 2010). Therefore, the cost of building per square metre is a major determinant of the value of real estate supplied.

The developers of real estates in Kenya do not use their personal savings as the only source of finance given that real estate development requires heavy financing, which may go way beyond what an individual or organization has accumulated as savings over time. In this regard therefore, developers always turn to the lenders of housing finance in order to compliment their inadequate finances (Mbugua, 2010).

From a developer's perspective, the lack of equity finance in the residential housing sector has been a critical constraint contributing to the insufficient, or oftentimes inadequate, housing stock in several countries across the continent. Housing developments with too low equity make it difficult to access debt finance for construction, resulting in no margins for delays or in cost over-runs. This limits the

development of housing projects delivered to market, resulting in higher priced housing stock and threatening the capital introduced by the developer in the first place. Excessive debt leveraging of real estate developments also obliges developers to engage into high levels of pre-sales in order to have a cash-flow that allows for loan repayments over the course of construction. This can compromise any deposit finance from initial purchasers who invest in pre-sales and induces a cash-flow risks to the developers as well as foregone income since they would tend to sell at a lower price than if they did at the end of construction (Africa Economic Brief, 2013).

## **2.4 Empirical Studies**

Poterba (1984) models the housing market using an asset approach, defines supply as net investment in structures. He assumes that investment supply depends on real house price, the real price of alternative investment projects, and the construction wage rate. He estimates various linear models using quarterly data from 1964 to 1982. To explain the impact of credit rationing he includes alternative indicators of credit availability. Knowing that houses take time to build, he uses one-quarter ahead forecasts of real house price and the real price of alternative investment projects. Since new houses take time to sell, he adjusts real house price to reflect interest costs incurred during the period from completion to sale. Investment supply is measured as the value of one-family structures put in place or as a rate of new housing investment defined relative to aggregate real output.

In the best-fitting models, the elasticity of the rate of new construction with respect to real house prices varies from 0.5 to 2.3. He detects a significant relationship between credit availability and the rate of housing investment, supporting the "supply effect"

hypothesis that credit availability affects the flow of new construction. The measures of construction costs, such as the construction wage, produced unexpected signs and no statistical significance. Their measures of construction costs do not have a significant impact on housing starts, the cost of capital to the builders are explained by real interest rates.

Topel and Rosen (1988) studied new housing supply by considering whether current asset prices are sufficient for housing investment decisions. If they are, then the short-run and long run investment supplies are identical; if they are not, because of costs associated with moving resources between industries, then short run supply is less elastic than long run supply. As a result, builders and developers must anticipate future asset prices in making current construction decisions.

They incorporate these supply dynamics by specifying the industry's cost function in terms of both the level and the rate of change in construction, along with cost variables conclude that real interest rates and expected inflation have a significant impact on development. They argue that the impact of inflation is difficult to explain and that the magnitude of the coefficient on real interest rates is too big to just reflect the cost of capital. They also argue that the impact of inflation may reflect changes in the velocity at which houses are sold at market prices, to test this explanation they put the median months on the market for new houses, their results show a significant and negative impact of that variable on house starts. But again they argue that the effect is too big to reflect the holding costs related to sales delay.

DiPasquale and Wheaton (1994) specify new construction (housing starts) as a linear



function of new housing price, the short-term real interest rate (the real cost of short term construction financing), the price of agricultural land, construction costs (indices for construction), and lagged housing stock. The change in aggregate employment and the number of months from completion to sale for new homes are also introduced as indicators of housing market conditions.

They estimate alternative linear versions of their supply framework using aggregate annual data from 1963 through 1990. They restrict their analysis to single-family housing and measure new construction as the number of single-family housing starts. In all specifications, the coefficient on housing price is significantly positive. Their estimates of the long-run PES range from 1.0 to 1.2. They conclude that the stock adjusts to its long run equilibrium through new construction very slowly, the rate of adjustment is about 2% per year.

Blackley (1999) used annual data from USA for the period 1950 to 1994. The basic model expresses residential construction as a linear function of new housing price, the prices of construction materials and labor, the real interest rate and the expected inflation rates. He also considered the effects of land price, lagged housing stock and the price of non-residential construction. The variables are expressed in levels.

The first conclusion is that the new housing supply is relatively price elastic in the long run. However in the models with variables expressed in differences, the long-run elasticity is lower, about 0.8. The second conclusion is that nominal interest rates influence new housing supply directly. And the third conclusion is that the temporal properties of each data series should be considered when specifying and estimating

time series models of new housing supply, for example, with variables expressed in levels, supply is elastic, but with explanatory variables expressed in differences, supply is inelastic.

Mbugua (2010) undertook a study on macroeconomic determinants of supply of houses in real estate industry in Kenya. Descriptive correlation research design was used and data on new houses built annually and price levels of houses in Kenya was obtained from the real estate firms e.g. Hass consultant, data for interest rate was obtained from the Central Bank of Kenya (CBK) while data for growth of GDP was obtained from the yearly economic surveys and the statistical abstracts between 1987 and 2012 from Kenya National Bureau of Statistics. A positive and significant relationship between supply of houses in real estate sector in Kenya and the price levels was established and that growth of GDP and interest levels have an influence on supply of houses.

Makena (2012) evaluated factors that have been affecting the real estate market prices in Nairobi. There was little empirical study prior to this. In particular she evaluated how interest rates, level of money supply, rate of inflation, employment rate and population growth affected house prices.

Using secondary data collected from the Central Bank of Kenya, Kenya National Bureau of Statistics and the Hass Consulting Ltd., a multivariate regression was done using SPSS to establish the relationships. The study found out that employment growth and the level of money supply information can give economists and financial analysts a better understanding of the real estate market and its influence on real estate

prices. An increase in interest rates reduces residential real estate prices.

A study on the economic variables that influence the residential property market in South Africa, with a perspective on the developer, between the year 2006 and 2012 was undertaken by (Theuns, 2012). By employing linear regression analysis, the research findings were that the GDP contributed to 69% in the changes that occurred in the house price index and a further 25% contributed by factors together such as: Inflation Rate, household disposable income, final household consumption, household and debt ratio.

Muli (2012), using quantitative research design on a study of Assessment of the Factors Affecting the Growth in Real Estate Investment in Kenya, concluded that GDP, interest rates and inflation rates were the major determinants of real estate investment at the 0.05 level as per the SPSS fitted model.

Besides GDP growth contributed the most to the growth in real estate in Kenya. Population growth had a statistically insignificant negative impact on real estate investment. GDP was positively related to real estate investment whereas interest rates and inflation rates were negatively related to the growth in real estate. Factors such as Interest rates, GDP and inflation rate had statistically significant influences on real estate investment population.

Kangongo (2013) sought to establish the Relationship between Inflation Rates and Real Estate Prices in Nairobi, Kenya. Simple linear regression model was used to determine the nature of the relationship. Property prices were collected from the

ministry Lands, Housing and Urban development, while inflation rates data was collected from the Kenya National Bureau of statistic. The findings of this study show that there is no clear relationship between the property price and the inflation rate.

Karoki (2013) undertook a study on Determinants of real estate prices in Kenya using descriptive and multivariate regression models found out that there are significant relationships between residential real estate prices and interest rates, GDP, and level of money supply. Interest rates have the most significant effect on house prices followed by GDP and level of money supply.

Thus the rise in property prices is well explained by macroeconomic variables. Although the study established a positive relationship between residential real estate prices and inflation rates, the relationship was found to be insignificant. She noted an overall increase in property prices with time indicating that the real estate market in Kenya is expected to continue to grow hence a mark of stability.

Ogun, Ogunsina, and Ugochukwu (2014) undertook a study on assessment of the impact of inflation on construction material prices in Nigeria, with a focus on Lagos for the period 1998 to 2007. The study employed descriptive analysis and regression model in inferential analysis. The results of the study showed that increase in construction material prices is not only caused by inflation, but also other macro-economy factors such as importation, interest rate, GDP also contributes to these increases and have an effect on the trend in price movement. The research also showed that the construction industry inflation is not equal to the economy wide inflation.

## **2.5 Summary of Literature Review**

Housing supply is the result of the decision making by land developers and by the actual owners of housing. Inflationary effects on the construction industry are vital to the developer. The residential property developer must have a fair knowledge with regards to the changes in the economy and the effects of these changes. This knowledge is critical in order to make good business decisions and future project planning.

The various studies done locally and abroad mainly dwell on macroeconomic factors that affect the real estate sector and houses prices. Muli (2012) concludes that inflation affects real estate supply negatively. Kangongo (2013) research findings revealed that there is no clear relationship between the property price and the inflation rate. Ogun, Ogunsina, and Ugochukwu (2014) concluded that increase in construction material prices is not only caused by inflation, but also other macro-economy factors such as importation, interest rate, GDP also contributes to these increases and have an effect on the trend in price movement. The research also showed that the construction industry inflation is not equal to the economy wide inflation.

The above researchers have not concentrated on the matter of inflationary effects on value of housing supplied by real estate developers, which matter this research paper dwells on.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

Research design is an outline of research study which indicates what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data. A research design is the arrangement of conditions for data collection and analysis of data in a manner that aim to combine relevance to research purpose with economy in research procedure (Kothari, 2004).

This chapter examines the methodology used to carry out the study and collect data. It discusses the research design employed, the study population and sample, data collection, data analysis and the analytical model used. The study was conducted as a descriptive survey of the sampled population. The survey method is relevant because it allows a great flexibility essential for analysis and the study of the information collected. It had the advantage of generating in-depth information.

#### **3.2 Population**

Mugenda & Mugenda (2003) described population as the entire group of individuals or items under consideration in any field of inquiry and have a common attribute. The population in this study was the real estate developers while the target population included private and public property developers. The population is all the 60 real estate developers in Kenya, who are registered in the KPDA (Appendix I).

### 3.3 Data Collection

Value of real estate supplied, Level of debt financing and construction cost per square foot, the data was available in Kenya National bureau of statistics, Central Bank of Kenya and the Hass consult Property Index. Inflation Rates data was obtained from the Central Bank of Kenya (CBK) while data for growth of GDP, Employment Rate and Population Growth Rate was obtained from the Kenya National Bureau of Statistics.

Data used is for 5 years spanning from year 2009 to year 2013.

### 3.4 Data Analysis

This study borrowed the supply theory model. This model was chosen taking into consideration to the availability of data. The study hypothesized that the increase in new houses in Kenya is determined by inflation, growth in GDP, Cost of construction and percentage of capital sourced from debt. Other factors included are Employment rate and Population growth rate. The following modified supply function was assumed for multiple regression using ordinary least squares (OLS) method:-

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e$$

Where:

Y = Value of real estate supply (VAL)

Measured by the multiple of annual number of properties for sale in Kenya and the average annual asking price per property.

$\beta_0$  is the Y-intercept,

$\beta_1 - \beta_5$  = Regression Coefficients

$X_1$  = Inflation Rate (INF)

Measured by the average annual inflation rate in Kenya.

$X_2$  = GDP

Measured by the average annual GDP Growth rate in Kenya

$X_3$  = Population Growth (POP)

Measured by the annual Population Growth Rate in Kenya

$X_4$  = Employment rate (EMP)

Measured by the annual Employment rate of the working population Kenya.

$X_5$  = Level of debt financing

Measured by the percentage of construction capital sourced from debt financing annually.

$X_6$  = Construction Cost per square foot

Measured by the average annual construction cost per square foot.

$e$  = Error Term

The model was estimated using balanced data estimation. Panel data models are more efficient as they control the chance of biased results by providing more degrees of freedom on pooling data. The models are used in three specifications: common constants; allowing for fixed effects and allowing for random effects.



The model will be estimated using a system of Ordinary Least Squares (OLS), with period seemingly unrelated regressions. Next, the researcher will assess the appropriate stochastic assumptions of the regressors on components of the error term. This is very crucial for the estimation of the parameter  $\beta$ . The multiple regression function expresses the effect of each of the independent variables on the dependent variable. The value of  $\beta$  will be the degree of the effect on dependent variable. A positive or negative sign will show the direction of the relationship. The higher the value of  $\beta$ , the higher the effect of that particular variable on dependent variable (Makena, 2012).

## CHAPTER FOUR

### DATA ANALYSIS, RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter presents and discusses the data analysis, findings, interpretations and presentation of the study in line with the research objective. Research objective is to establish the effect microeconomic factors on value of real estate supply in Kenya. These factors are Inflation, GDP, Population growth rate, Employment rate, Percentage of debt financing in construction and Cost of construction.

#### 4.2 Descriptive Statistics

Table 1 below provides some descriptive statistics the variables in the study. These include the mean, median, standards deviation, minimum and maximum values.

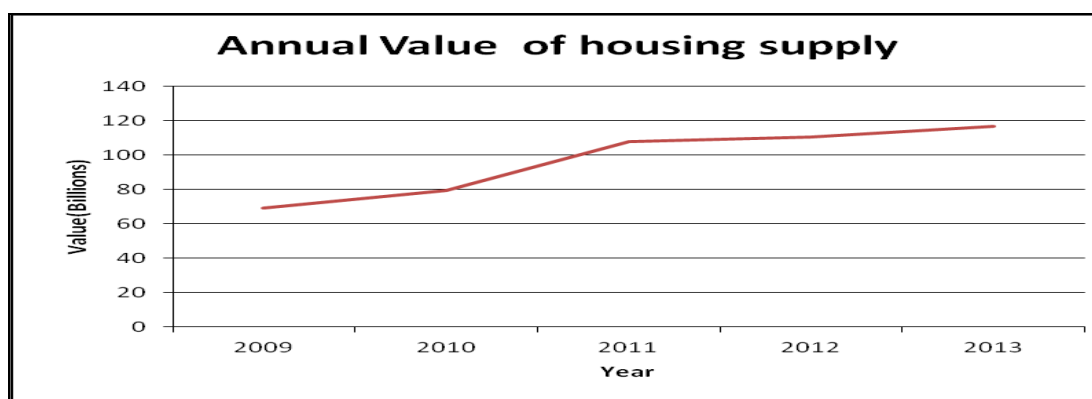
**Table 1: Descriptive Statistics**

| <b>Descriptive Statistics</b> | <b>Value of real Estate Supplied</b> | <b>Inflation Rate</b> | <b>GDP</b> | <b>Population Rate</b> | <b>Employment Rate</b> | <b>Percentage of debt funding</b> | <b>Cost of construction</b> |
|-------------------------------|--------------------------------------|-----------------------|------------|------------------------|------------------------|-----------------------------------|-----------------------------|
| <b>Mean</b>                   | 96.70                                | 8.74                  | 4.44       | 2.72                   | 55.78                  | 43.39                             | 6,241.29                    |
| <b>Median</b>                 | 107.90                               | 9.40                  | 4.60       | 2.74                   | 60.00                  | 38.18                             | 6,236.43                    |
| <b>Std. Deviation</b>         | 20.99                                | 3.94                  | 1.11       | 0.02                   | 8.36                   | 17.96                             | 529.40                      |
| <b>Minimum</b>                | 69.30                                | 4.10                  | 2.70       | 2.70                   | 40.90                  | 22.66                             | 5,625.35                    |
| <b>Maximum</b>                | 116.60                               | 14.00                 | 5.80       | 2.74                   | 60.00                  | 62.14                             | 6,950.42                    |

The Value of real estate supply has been on an upward trend with a low of Kshs. 69.3 Billion in 2009 and a high value of Kshs. 116.6 Billion in year 2013. The period recorded a mean Value of Kshs. 96.7 Billion while Standard deviation was at 20.99. Therefore the Value of real estate supply has been on a consistent rise with a major

jump of price from year 2010 to 2011 from Kshs. 79.3 Billion to Kshs. 107.9 Billion. The median recorded was Kshs. 107.9 Billion. This has shown consistence with cost of Construction, % of debt financing, and GDP which have recorded upward movement.

**Figure 1: Annual Value of Housing Supply.**

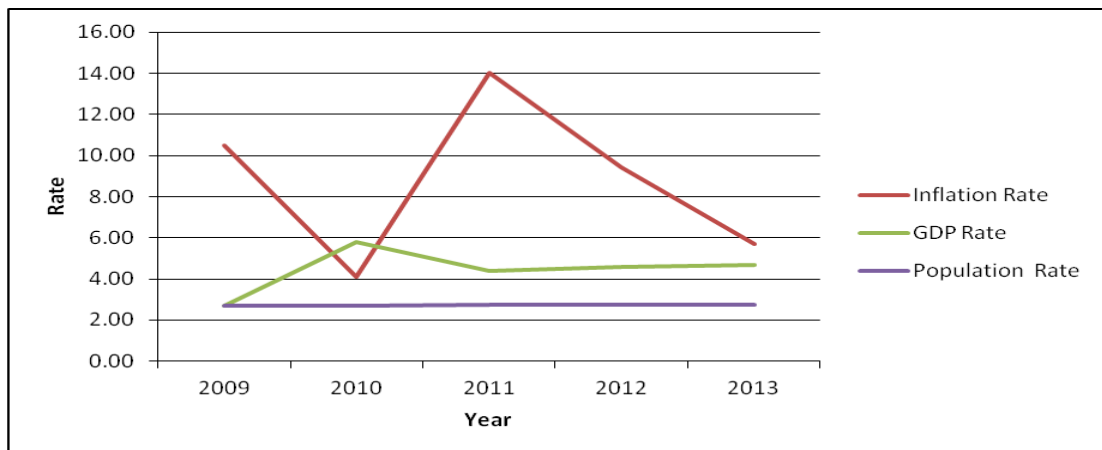


**Source: Research Data**

Descriptive statistics for inflation in Table 1 above record an erratic movement for the period 2009-2013 with a minimum of 4.1 year 2010 and a maximum of 14.0 in year 2011 after which there was a downward trend to 5.7 points in 2013. The mean was 8.74 with a medium of 9.4. Standard deviation recorded was 3.94. GDP recorded a high of 5.8 and a low of 2.7 points in the peirod of study. The mean and medium was 4.44 and 4.6 respectively . The Standard deviation of 1.11 indication that the year to year changes of GDP were minimal.

The population grow rate was steady, with values between 2.7% and 2.74%. The constant nature was recorded in the standard deviation value of 0.02. The mean was 2772 and median 2.74. Figure 1 below illustrates the movement of Inflation rate, GDP and Population growth rate over the preiod of study.

**Figure 2: Inflation rate, GDP and Population Rate Movement**

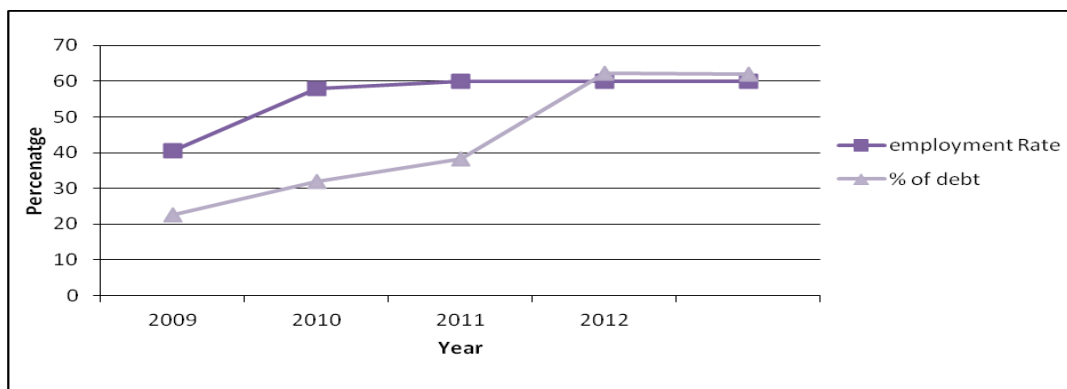


Source: Research Data

Employment rate has been on the rise from year 2009 from 40.9% to a constant of 60% through the following period. The standard deviation recorded was 8.3 due rise from 40.9% in 2009 to 58.0% in 2010. Thereafter a constant growth rate of 60 has been observed. The mean being 55.78% and median being 60%.

The amount of construction capital sourced from debt financing has been on the rise from a low of 23% in 2009 and a high of 62% in 2012 and 2013. Both years 2012 and 2013 recorded the same amount of debt financing at 62%. Figure 2 illustrates the movement of Employment Rate and debt financing.

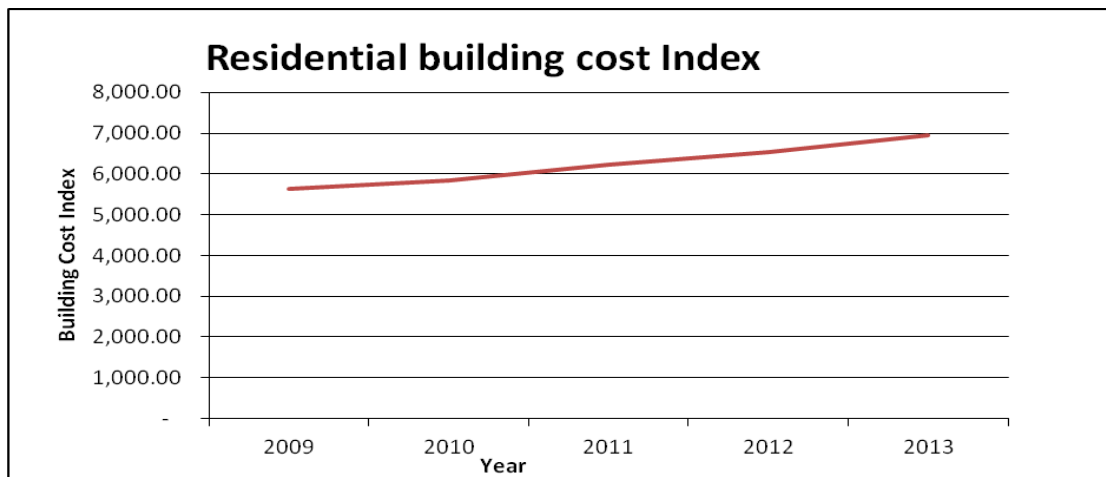
**Figure 3: Employment Rate and Cost of debt financing**



Source: Research Data

The cost of construction has been on a steady rise from a minimum of 5,625.35 points in 2009 to a maximum of 6,950.42 points in 2013. The mean cost of construction recorded was 6,241.29 and standard deviation of 529.40. Median recorded was 6,236.43. Figure 3 below illustrates the movement.

**Figure 4: Residential Building Cost Index year 2009 to 2013**



**Source: Research data**

## **4.2 Correlation Analysis**

The correlations table displays Pearson correlation coefficients, significance values, and the number of cases with non-missing values. The Pearson correlation coefficient is a measure of strength of association between two variables. Pearson correlation coefficients assume the data are normally distributed. The values of the correlation coefficient range from -1 to 1. The sign of the correlation coefficient indicates the direction of the relationship (positive or negative).

**Table 2: Pearson Correlation Coefficients**

|      | VAL      | INF   | GDP     | POP     | EMP     | DBT      | COST |
|------|----------|-------|---------|---------|---------|----------|------|
| VAL  | 1        |       |         |         |         |          |      |
| INF  | .121     | 1     |         |         |         |          |      |
| GDP  | .330     | -.585 | 1       |         |         |          |      |
| POP  | .983(**) | .275  | .276    | 1       |         |          |      |
| EMP  | .795     | -.185 | .818(*) | .776    | 1       |          |      |
| DBT  | .965(**) | -.079 | .426    | .927(*) | .812(*) | 1        |      |
| COST | .939(**) | -.153 | .330    | .864(*) | .708    | .962(**) | 1    |

\*\* Correlation is significant at the 0.01 level (1-tailed).

\* Correlation is significant at the 0.05 level (1-tailed).

**Source:** Research Data

It is clear from the table that all independent variables have a positive relationship with the Value of real estate supplied. The absolute value of the correlation coefficient indicates the strength, with larger absolute values indicating stronger relationships. The correlation coefficients on the main diagonal are always 1.0, because each variable has a perfect positive linear relationship with itself. The significance of each correlation coefficient is also displayed in the correlation table, with Population having the highest at 0.983 and Inflation the lowest at 0.121, an indication of a poor linear relationship. But this is also a multicollinearity problem.

The significance level (or p-value) is the probability of obtaining results as extreme as the one observed. If the significance level is very small (0.05) then the correlation is significant and the two variables are linearly related. If the significance level is relatively large (for example, 0.2) then the correlation is not significant and the two variables are not linearly related. Inflation and GDP had a p value greater than 0.05, hence correlation to Value of real estate was not significant, evidence of lack of a linear relationship.

### 4.3 Regression Analysis

Multiple regression model was used to establish relationship between Inflation, growth rate in GDP, Population Growth rate, Employment rate, % Construction Debt Financing, Cost of Construction and the Value of Real Estate Supply in the market.

**Table 3: Model Summary**

| Model | R       | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|---------|----------|-------------------|----------------------------|
| 1     | .986(a) | .973     | .891              | 6.9269463                  |

a Predictors: (Constant), DBT, INF, COST,GDP

Adjusted  $R^2$  is called the coefficient of determination and tells us how the supply of houses in the real estate in Kenya varied with the independent variables, Inflation, GDP, Cost of Construction and Percentage of Debt Financing. The research findings indicated that there was a very strong positive relationship between the variables with an adjusted R square of 0.891. Therefore any variability in Value of real estate supply is explained in Inflation, GDP, Cost of Construction and Percentage of Debt Financing.

**Table 4: ANOVA(b)**

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.     |
|-------|------------|----------------|----|-------------|--------|----------|
| 1     | Regression | 1714.677       | 3  | 571.559     | 11.912 | 0.209(a) |
|       | Residual   | 47.983         | 1  | 47.983      |        |          |
|       | Total      | 1762.660       | 4  |             |        |          |

a Predictors: (Constant), DBT, INF,COST,GDP

b Dependent Variable: VAL

F test has a significance level of  $0.209 > 0.05$ , which indicates we reject the null hypothesis that  $\beta_1 - \beta_6 = 0$ . The Regression sum of squares as a percentage of Total sum of squares shows that 97.3% of the variability of Values of real estate is

explained by the independent variables.

**Table 5 : Coefficients(a)**

| Model |            | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|------------|-----------------------------|------------|---------------------------|--------|------|
|       |            | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant) | -30.668                     | 26.251     |                           | -1.168 | .035 |
|       | INF        | 1.223                       | 1.115      | .229                      | 1.097  | .423 |
|       | GDP        | 1.058                       | 4.338      | .056                      | .244   | .294 |
|       | COST       | .036                        | .001       | .913                      | 2.408  | .009 |
|       | DBT        | 30.741                      | 6.004      | .960                      | 5.120  | .004 |

a Dependent Variable: VAL

The independent variables Population growth rate and Employment rate recorded constant values over the period and therefore could not be applied on the model to establish their effect on the Value of real estate supplied. On incorporating the coefficients of the remaining variables, the model becomes as follows:

$$\text{Value} = -30.668 + 1.223\text{INF} + 1.058\text{GDP} + 0.036\text{COST} + 30.741\text{DBT} + e$$

The results showed that there was a positive relationship between all the variables namely Inflation rate, GDP growth rate, Cost of construction and Percentage of debt financing on the Value of real estate supply. The level of significance of results is acceptable for Cost of construction and percentage of debt funding which produce p values less than 0.05. Inflation and GDP had their p values greater than 0.05 an indication of an insignificant relationship. On elimination the two variables from the model, we have the following equation.

$$\text{Value} = -30.668 + 0.036\text{COST} + 30.741\text{DBT} + e$$



#### **4.4 Discussion of Research Findings**

The model indicated that the variables being Inflation, GDP, cost of construction on percentage of debt financing all had a positive impact on the value of real estate supplied. If all factors were held constant, the Value of real estate supply will be negative at Kshs. -30.7. This illustrates how the dependent factors are crucial to development of real estate, without which no real estate would be supplied.

The results indicated that Debt financing had the highest impact on Value of real estate supply. A unit increase in debt financing affected the value supplied by 30.74 times. This is an indication that there is a high reliance on debt financing on the development of real estate and the cost is passed on to the value of housing, borne by the purchaser. This explains the high cost of housing in Kenya, far beyond the reach of majority of the population.

Second in line was inflation, with a unit increase resulting to an increase of 1.223 in value of real estate supplied. Inflation rates recorded an erratic movement within the period of study which is not the case for the value supplied. This is explained by the low coefficient value. A unit increase in GDP followed closely with a unit increase having an effect of 1.058 on value of real estate. Additionally, from the descriptive statistics, the inflation rate movement was erratic while movement of real estate value was on an upward trend. However, the effect of the two variables were not significant.

Cost of construction had the least effect on value of real estate supply by a margin of

0.036. From descriptive statistics above, the cost of construction was on a steady rise from a minimum of 5,625.35 in 2009 to a maximum of 6,950.42 in 2013. The level of significance of results is acceptable for Cost of construction and percentage of debt funding which produce p values less than 0.05. Inflation and GDP had their p values greater than 0.05 an indication of an insignificant relationship.

From the correlation analysis, it was clear that Value of real estate had linear relationships with Population growth, Employment rate, Cost of construction and debt financing, all with p values  $<0.05$ . On the contrary, Inflation and GDP had no linear relationship with P values of .423 and .294. To support the linear relationship, the correlation coefficients of all the other variables except GDP were between 0.795 and 0.983, while inflation and GDP had 0.121 and 0.330 respectively.

Mbugua (2010) established a positive relationship between house prices and GDP, which is supported by this study. He also noted that developers always turn to the lenders of housing finance in order to compliment their inadequate finances supported by the high levels of debt financing and the impact it has on value of housing supply.

Muli (2012) concluded that GDP, interest rates and inflation rates were the major determinants of real estate investment. He observed that population growth had a statistically insignificant negative impact on real estate investment while Inflation rate and GDP had statistically significant influences. Karoki (2013) study on Determinants of real estate prices in Kenya using descriptive and multivariate regression models established significant relationships between residential real estate prices and interest rates, GDP, and level of money supply.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter is a synthesis of the entire report and contains summary of findings, conclusions arrived at, the recommendations and the suggestions for further study.

#### **5.2 Summary of Findings**

The purpose of the study was to investigate effect of macroeconomic factors on value of real estate supplied. The researcher sought to confirm theoretical relationships between Value of real estate and Inflation rate, GDP, Employment Rate, Population growth rate, Employment rate, percentage of debt financing in construction and cost of construction. If all factors were held constant, the Value of real estate supply will be negative at Kshs. -30.7. This illustrates how the dependent factors are crucial to development of real estate, without which no real estate would be supplied.

The results indicated that Debt financing had the highest impact on Value of real estate supply. A unit increase in debt financing affected the value supplied by 30.74 times. This is an indication that there is a high reliance on debt financing on the development of real estate and the cost is passed on to the value of housing, borne by the purchaser. This explains the high cost of housing in Kenya, far beyond the reach of majority of the population.

Descriptive statistics indicate that debt financing is on a continuous rise, from 23% in 2009 to 62% in year 2013. The variable has a linear relationship with Value of real

estate supplied which has also been on the rise from Kshs. 69.3 Billion in 2009 to 116.6 Billion in 2013. Second in line was Inflation, with a unit increase resulting to an increase of 1.223 in value of real estate supplied. Inflation rates recorded an erratic movement within the period of study which is not the case for the value supplied. This is explained by the low coefficient value. A unit increase in GDP followed closely with a unit increase having an effect of 1.058 on value of real estate. Additionally, from the descriptive statistics, the inflation rate movement was erratic while movement of real estate value was on an upward trend. Cost of construction had the least effect on value of real estate supply by a margin of 0.036. From descriptive statistics above, the cost of construction was on a steady rise from a minimum of 5,625.35 in 2009 to a maximum of 6,950.42 in 2013.

## **5.2 Conclusions**

From the findings of the analysis above, the conclusion is that there are significant relationship between Value of real estate supply and the dependent variables inflation, GDP, Cost of construction and percentage of debt financing. All the variables have a positive effect which implies that any change in the variables leads to a positive change in the Value of real estate supply, but the change is of different magnitudes as represented by the beta values in the model.

The variables Population growth and Employment rate had constant data values for the period of study and were therefore deemed to be of no use in the model. These variables were therefore exempted from the model and analysis of the model.

From correlation analysis, Inflation and GDP did not have a linear relationship with Value of real estate supply as evidenced in both correlation analysis and regression analysis where the P values are greater than 0.05. Debt financing and cost of construction both were found to have a strong correlation with P values  $< 0.05$ .

In conclusion, the outcome of regression analysis indicates that all the variables inflation rate, GDP, cost of construction and Percentage of debt financing recorded positive effect on value of real estate supply. Therefore a positive change in any of them would have a significant change in the value of real estate supplied.

### **5.3 Policy Recommendations**

Real estate supply is of much importance to the country and proper regulations and guidelines need to be put in place. As per research findings, debt financing is the major source of capital, which is currently quite costly due to the high interest rates recorded in the country. The government should regulate the lending industry towards real estate. This is to enable both developers and suppliers access inexpensive funds and enable realization of the housing goals for majority of Kenya population.

Data on real estate is quite minimal, scattered and undetailed. The government should engage the housing ministry to have a fully equipped data collection and analysis section. An annual or quarterly data collection and analysis exercise in each county should be carried out and compiled to ease availability of the data on the industry. This will enable decision making to improve the future of real estate in Kenya.

The real estate industry is a major contributor to GDP and a study on the same would be ideal with the view that Kenya has become a middle income country due to growth of the Real Estate sector, being a major contributor to the debasing of the Kenyan economy.

The cost of housing is quite high using data on average sale prices per unit and is not accessible to majority of Kenyans. Government should fast track availability of low-cost but good quality housing to majority of the Kenyan population. This can be by way of engaging other countries with a history of cheaper construction technology and enable set up of industries to manufacture the cheaper but quality construction materials.

#### **5.4 Limitations of the Study**

The study encountered various limitations which hindered access to information. The first limitation was limited information regarding value of real estate supply. The main issue was to access the number of houses on sale annually. The data used was what was available in the CBK database being completed residential units per year. This served the purpose to calculate the value using the available average sale price, availed by only one real estate company that undertakes data collection and analysis on housing in Kenya.

Data on cost of construction per square foot was hardly available and data on cost of construction index by CBK was used for the study. The source of this data is reliable. The constant nature of employment rate at 60% and population growth rate at 2.74% was a limitation that resulted to these variables being eliminated from the regression

equation. This research data could have been applicable if a longer period was applied.

Time was also quite a limitation since the date required adequate time to collect and analyze. Some of the organizations were not willing to provide information easily which called for more time to access the data.

## **5.5 Recommendations for Further Research**

The data on population growth and employment rate recorded constant figures for the period of study. I recommend that a study on the effect of these factors to value of real estate supplied be carried out over a long period of time. The test statistics were not significant for the period of study. I also recommend a similar study for a longer period of study.

The real estate industry is a major contributor to GDP and a study on the same is necessary. GDP is a reflection of the economy and therefore effect of GDP on the Value of real estate supplied. Kenya has become a middle income country due to growth of the Real Estate sector, reflected by contribution of the real estate sector to GDP.

Further studies should be carried out to determine the extent to which demand for real estate affects the value supplied. The value supplied, being a multiple of real estate units supplied and the annual average sale price per unit, is an indicator that prices are quite high, limiting affordability.

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## **APPENDICES**

### **Appendix I: Real Estate Developers in Kenya**

1. Active Homes
2. Afriland Agencies
3. Ark Consultants Lt
4. Betterdayz Estates
5. Canaan Properties
6. Capital City Limited
7. Colburns Holdings Ltd
8. Coral Property Consultants Ltd
9. Country Homes and Properties
10. Crown Homes Management
11. Daykio Plantations Limited
12. Double K Information Agents
13. Dream Properties
14. Dunhlill Consulting Ltd
15. East Gate Apartments Limited
16. East Gate Apartments Limited
17. Ebony Estates Limited
18. Economic Housing Group
19. Elgeyo Gardens Limited
20. Fairway Realtors and Precision Valuers
21. FriYads Real Estate
22. Greenspan Housing

23. Halifax Estate Agency Ltd.
24. Hass Consult
25. Hewton Limited
26. Homes and lifestyles
27. Housing Finance
28. Jimly Properties Ltd
29. Jogoo Road Properties
30. Josekinyaga Enterprises Ltd
31. Josmarg Agencies
32. Karengata Property Managers
33. Kenya Prime Properties Ltd
34. Kenya Property Point
35. Kilifi Konnection
36. Kitengela Properties Limited
37. Knight Frank Limited
38. KusyombunguoLukenya
39. Land & Homes
40. Langata Link Estate Agents
41. Langata Link Ltd
42. Lantana Homes
43. Legend Management Ltd
44. Lloyd Masika Limited
45. Mark Properties Ltd.
46. MarketPower Limited
47. Mentor Group Ltd

48. Merlik Agencies
49. Metrocosmo Ltd
50. Mombasa Beach Apartments
51. Monako Investment Ltd
52. Muigai Commercial Agencies Ltd.
53. Myspace Properties (K) Ltd.
54. N W Realite Ltd
55. Nairobi Real Estates
56. Neptune Shelters Ltd
57. Oldman Properties Ltd
58. Oloip Properties
59. Raju Estate Agency Limited (REAL)
60. Tysons Limited

**Source:** Kenya Property Developers Association Database

## Appendix 2: Value of Real Estate Supply

| Year | Av. Asking price-sale | Units developed | Total value        | Amount (Billions) |
|------|-----------------------|-----------------|--------------------|-------------------|
| 2009 | 19,476,563            | 3,557.00        | 69,278,134,591.00  | 69.3              |
| 2010 | 16,810,000            | 4,715.00        | 79,259,150,000.00  | 79.3              |
| 2011 | 21,970,000            | 4,912.00        | 107,916,640,000.00 | 107.9             |
| 2012 | 22,016,172            | 5,016.00        | 110,433,117,080.00 | 110.4             |
| 2013 | 22,075,312            | 5,280.00        | 116,557,645,600.00 | 116.6             |

**Sources:** Hass Consult Property Index.(Average Asking Price)  
Central Bank of Kenya (Number of Units developed)

### **Appendix 3: Annual Inflation Rate**

| <b>Year</b> | <b>Average annual rate</b> |
|-------------|----------------------------|
| <b>2009</b> | 10.50                      |
| <b>2010</b> | 4.10                       |
| <b>2011</b> | 14.00                      |
| <b>2012</b> | 9.40                       |
| <b>2013</b> | 5.70                       |

**Source:** Central Bank of Kenya (CBK)

### **Appendix 5: Annual Employment Rate, Population Growth Rate and GDP Rate.**

| <b>Year</b> | <b>Employment Rate</b> | <b>Population Growth rate</b> | <b>GDP Rate</b> |
|-------------|------------------------|-------------------------------|-----------------|
| 2009        | 40.9%                  | 2.70%                         | 2.7             |
| 2010        | 58%                    | 2.71%                         | 5.8             |
| 2011        | 60%                    | 2.74%                         | 4.4             |
| 2012        | 60%                    | 2.74%                         | 4.6             |
| 2013        | 60%                    | 2.74%                         | 4.7             |

**Source:** Kenya Bureau of Statistics



## **Appendix 6: Annual Construction Cost (Residential housing construction Index)**

| <b>Year</b> | <b>Building cost Index</b> |
|-------------|----------------------------|
| 2009        | 5,625.35                   |
| 2010        | 5,854.44                   |
| 2011        | 6,236.43                   |
| 2012        | 6,539.83                   |
| 2013        | 6,950.42                   |

**Source:** Kenya Bureau of Statistics

## **Appendix 7: Percentage of Debt Finance in Construction**

| <b>Year</b> | <b>Total Value Supplied</b> | <b>Debt Amount</b> | <b>% of debt</b> |
|-------------|-----------------------------|--------------------|------------------|
| 2009        | 69.3                        | 15.7               | 23%              |
| 2010        | 79.3                        | 25.3               | 32%              |
| 2011        | 107.9                       | 41.2               | 38%              |
| 2012        | 110.4                       | 68.6               | 62%              |
| 2013        | 116.6                       | 72.4               | 62%              |

**Source:** Central Bank of Kenya